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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/827,348

04/20/2004

Chan-bong Jun

277/038

2613

7590

02/22/2006

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EXAMINER

SUMMONS, BARBARA

ART UNIT

PAPER NUMBER

2817

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

**Office Action Summary**

Application No.

10/827,348

Applicant(s)

JUN ET AL.

Examiner

Barbara Summons

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-20 is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☒ Claim(s) 3-5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Withdrawn Claim Rejections - 35 USC § 102***

1. Applicant's arguments, at section D. of the amendment, filed 12/8/05, with respect to the Fukuda et al. reference have been fully considered and are persuasive because the Examiner agrees that the "buried" resistance layer 32 of Fukuda et al. is not "formed on a surface of the semiconductor substrate". The rejection of claims 1-3 based on Fukuda et al. has been withdrawn.

### ***Maintained Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as being anticipated by Barber et al. U.S. 6,486,751 (of record) for reasons of record mostly repeated below.

Fig. 6 of Barber et al. discloses a film bulk acoustic resonator (e.g. 60 in Fig. 11) comprising: a semiconductor substrate 12 (see e.g. col. 3, lines 24-25) that has a predetermined thickness; a first resistance layer 36 formed on a surface of the semiconductor substrate, the first resistance layer 36 having a recess 30; a membrane layer 32 formed on the first resistance layer 36 and over the recess 30, thereby forming in the recess an air gap region of the acoustic resonator; a first electrode 18 formed on the membrane layer 32; a piezoelectric layer 20 formed on the membrane layer and an

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exposed portion of the first electrode 18 being the whole first electrode 18; and a second electrode 14 formed on the piezoelectric layer 20.

***Allowable Subject Matter***

4. Claims 6-20 are allowable over the prior art of record.
5. Claims 3-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments filed 23/8/05 concerning the Barber et al. reference have been fully considered but they are deemed not persuasive.

Applicants argue that the air gap formed in the recess in Barber et al. is formed "by entirely removing the material of high resistivity layer 36" (see the amendment at page 9, the last three lines thereof) while the air gap of the invention is "formed in the recess in the first resistance layer and separated from the substrate" (see the amend. at page 10, lines 3-6). This argument is not persuasive for two reasons. Firstly, the argument is not commensurate with the scope of the claims since there is nothing in the claims requiring that the air gap be "separated from the substrate". Secondly, Applicants clearly indicate in their specification, that the "recess" can be formed by removing the entire resistance layer in such a way that the recess extends to the semiconductor substrate (see the spec. at page 11, lines 1-2 and page 7, lines 2-3 and 8-11). Applicants appear to be arguing the merits of claim 5, which was not rejected.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


Nakatani et al. U.S. 6,732,415 provides evidence that recesses extending all the way to the supporting substrate are art recognized equivalents of recesses that do not extend all the way to the substrate so that they have a bottom within the resistance layer (see Fig. 6F vs. Fig. 7), and Nakatani also discloses advantages of recesses with bottoms within the resistance layer (see col. 7, lines 24-29).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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February 16, 2006



**BARBARA SUMMONS  
PRIMARY EXAMINER**